ZEBRA MUSSEL MONITORING Guidelines for Stream Teams

How Stream Teams can help track the status of Missouri's latest threat to streams and lakes

Zebra Mussels Are Here!

Missouri has had its share of exotic species, but few are as potentially troubling as the zebra mussel. This animal has the capability of harming native mussels, causing problems at utility and industrial water intakes, and disrupting aquatic food chains.

The zebra mussel is an exotic bivalve mollusk of Eurasian origin. It is light and dark striped and attaches to almost any surface. Larval zebra mussels entered the US when a ship emptied bilge water into Lake St. Clair near Detroit, Michigan. The mussels found their new environment more than suitable, and have flourished...to the point that they are a nuisance.

Until the 1990's, Missouri had been zebra mussel-free. Then sightings from the upper and lower Mississippi River, Missouri River, and Meramec River confirmed that they are here, and they show indications that they are spreading.

Will they become a problem in Missouri? We don't know, but we think so based on what has happened elsewhere. There is the threat that they could attach to native mussels in such quantities that they will wipe out entire mussel beds...or an entire mussel species in a stream system. The diverse mussel fauna of the Meramec River, including several endangered species, is of immediate concern. They can also drive up the prices of drinking water, electricity and other products. It already costs Great Lakes power companies millions of dollars annually to clean mussel colonies from their water intakes and, while chlorine and other chemicals typically used in clearning operations are effective in zebra mussel control, they are toxic to other desirable aquatic organisms. Zebra mussels may also contribute to the decline of recreational fisheries in our lakes. They feed by filtering out organic material, minute algae and animal life, and collectively they have the ability of filtering and eating too much material, diverting vast parts of the lower end of the food chain into inedible zebra mussel flesh. The only known predators of zebra mussels are some diving ducks, freshwater drum, carp, and sturgeon. However, they don't eat enough mussels to have a significant effect on them.

Zebra mussel larvae can easily be carried from one water body to another on boat hulls and engine parts (drive units, props, anchor ropes), in bilge water, live wells and bait buckets, on trailers and other boat equipment, and anything that can be kept moist, even a tennis shoe. Because they are so mobile and transportable by so many means, their ability to spread is magnified. We don't need to panic; zebra mussels are probably going to be a fact of life in Missouri, but we can slow their spread. We need to monitor our stream and lake systems, and sound the alarm when they show up so appropriate steps can be taken. Stream Teams are in a unique position to help keep track of them.

Zebra Mussel Monitoring

If zebra mussels show up, state and federal agencies are poised to institute programs to slow their spread. The earlier that the mussel is detected, the earlier we can institute defense mechanisms. If there is no upstream source of zebra mussels, we continue to remove adults when we find them, and we institute some boat, motor, and other stream and river equipment cleaning procedures, we may be able to effectively keep zebra mussel numbers to a tolerable minimum.

The key is to find them, and that's where Stream Teams fit in. Simply put, agencies need a lot of eyes all over the state, watching for zebra mussels. We need Stream Teams to volunteer to monitor for the mussel and give us an immediate call when one is found. We also need to know where they aren't, and we need Teams committed to sending in regular data sheets whether zebra mussels are found or not.

Zebra Mussel Biology

To start monitoring for zebra mussels, you need to know a little about them. They get their name from the alternating light and dark strips on their shells. The mussel is also flattened on one side, on which the mussel attaches to firm substrates by means of attachment, or byssal, threads. While zebra mussels can exist alone, when undisturbed they are often found in large colonies. Zebra mussels can attach to almost any surface, although they prefer hard substrates like rock, metal or other mussel shells. They can grow to a length of one-half inch at the end of the first year, and can reach 2 inches in length in four or five years, the maximum life expectancy.

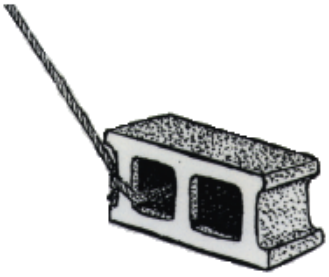
The life cycle of a zebra mussel is simple. Females can produce over 40,000 eggs in a reproductive cycle and approximately a million in a spawning season. Fertilization occurs outside the body, and upon hatching, the larval zebra mussel (known as a veliger) swims to the bottom of the lake or stream. There, they move along the bottom until they find a suitable substrate. They attach to the substrate with byssal threads and remain until they are disturbed or die.

Zebra Mussel Sampling Protocol

Stream Teams can be the primary first line of defense against the zebra mussel invasion just by looking. By using the following sampling protocol, you can help...and it's easy! Basically, zebra mussel monitors need to look for the mussel at their monitoring sites and send in a monthly report on whether they found any or not.

Equipment

The primary means of zebra mussel monitoring will be to use your eyes. By visually examining the bottoms, edges, and shorelines of streams or lakes, Stream Teams can detect either living adult zebra mussels or their empty shells (which would indicate they're living somewhere nearby). Also, look at rocks, crevices, woody debris, docks, and vegetation in the water for living adults. If you are looking for an excuse to do some snorkeling, a mask and fins are great for inspecting your site.



You can also add a substrate upon which zebra mussels can attach, and check it periodically. This is especially useful for deeper water. The substrate of choice is a concrete block. Concrete blocks are ideal surfaces for zebra mussel attachment, they are readily available, and they are cheap. Tie a rope (1/2 inch diameter or greater with a length depending on the depth of the water) to the block and secure the other end to something stationary on the bank. Two or three blocks placed in the upstream, middle, and downstream ends of your pool provide a good sample.

Can I Monitor My Adopted Stream?

We need information from all over the state on the presence and absence of zebra mussels, but especially in areas of high recreational use. If you have adopted a stream and wish to incorporate zebra mussel monitoring into your other activities, please do so. But we also need information from our popular float and fishing streams and all large lakes. Accurately record location information on the data sheet so we know where you are monitoring. If you would like suggestions on where to look for zebra mussels, please contact MDC's Stream Unit and we'll help you find a monitoring location that is convenient.

Where Do I Look?

If you are already monitoring water quality, look for zebra mussels at your current monitoring site. Generally, the best areas in a stream to look are in and along the edges of runs and pools with slow current. Check anything with a hard surface if you are just using your eyes. Zebra mussels prefer dark places and are commonly found in crevices and on the underside of rocks and other objects. If you are using concrete blocks, submerge them in inconspicuous spots away from heavily used areas to avoid tampering and the possibility of interfering with recreational activities. Locations downstream of boat ramps or canoe accesses are ideal, since these sites are potential areas of zebra mussel introduction. If you are using concrete blocks, place them in water 3-8 feet deep.

Remember, zebra mussels attach to hard substrates. They will be fastened tightly to rocks and other hard items. If they are loose or buried in the sand or silt, they probably are not zebra mussels.

How Long Do I Look?

Zebra mussel monitoring should be done during the warmer months, generally April through October. If you are visually examining a site, spend as much time as it takes to examine all hard-surfaced objects. On the data sheet, record the amount of time you spent looking. A monthly sampling trip is ideal, but looking for zebra mussels every 2 or 3 months is OK, too. If you are using concrete blocks, remove them and inspect for zebra mussels monthly. Record the number of blocks you are using on the data form.

What If I Find A Zebra Mussel?

If you find what you think is a zebra mussel, we need to know about it immediately. Please put a few of the specimens in a jar with isopropyl alcohol (rubbing alcohol that is commonly found in supermarkets and pharmacies), and keep them until a biologist contacts you and arranges to have the specimen's identification confirmed. Meanwhile, fax (573/526-0990) or e-mail (*streamteam@mdc.mo.gv)* your name, phone number, and location of the sighting to the Missouri Department of Conservation's Stream Team. You may also phone Stream Team at 1-800-781-1989 with your name, phone number, and location of the sighting. **Early detection and action can help slow the spread of this mussel, so report positive sightings as quickly as possible**.

Data Forms

In order to determine the origins of any zebra mussel infestations and to track the rates at which zebra mussels spread or are contained, we need regular reports from Stream Team monitors. Monitors will be given a supply of Zebra Mussel Monitoring Report Forms and self-addressed and postage-paid envelopes. Please complete and mail a report form each time you look for zebra mussels. Additional forms and envelopes can be requested by calling 1-800-781-1989.

So We Find Zebra Mussels; Can We Do Anything?

There are a number of things that can be done to slow the spread. When you are done floating or boating for the day, thoroughly inspect your boat or canoe hull (run your hand along the hull; if you feel a sandpaper-gritty feel, you may have veligers attached to your boat). Remove all water weeds hanging from the boat or trailer. Clean your boat, live well, bait bucket, bilge water, rope, and other equipment. Zebra mussels should be removed and discarded in the trash, not thrown back in the water. Trash leftover bait at the boat launch site; do not release unused bait to the wild, or you run the risk of introducing another foreign species to a natural system. When you get home, thoroughly flush the hull, motor, live wells, bilge, trailer, bait buckets, etc. using a hard spray from a garden hose. You can also use high pressure hot water at a do-it-yourself car wash. Dry the equipment thoroughly in the sun for 3-5 days. Don't use anything with chlorine in it (chlorine bleach, etc.); it's very toxic to aquatic life.

For More Information

Check out one of these web sites for more zebra mussel information:

http://nas.er.usgs.gov/zebra.mussel
http//www.entryway.com/seagrant/
http://www.ansc.purdue.edu/sgnis/home.htm.

Thanks For Your Help!

STREAM TEAM
ZEBRA MUSSEL MONITORING REPORT FORM

Name_____ **Stream Team Number**_____

Address_____

City, State, Zip_____

Phone Number day:_____ **evening:**_____

Name of Monitor(s) _____

Date of Sample_____

Stream Name_____ **County** _____

Location of Monitoring Site (Please be specific; give legal description or describe proximity to roads/highways/towns):_____

_____

_____

_____

Sampling Method (please check): ☐ **Visual observation**
☐ **Concrete block** **Number of blocks used** _____

Sampling Results (please check): ☐ **No zebra mussels found** ☐ **Zebra mussels present**

If zebra mussels present, how many did you observe?

☐ **One** ☐ **2-10** ☐ **11-50** ☐ **51-100** ☐ **>100**

Were the mussels: ☐ **Live** ☐ **Dead** ☐ **Both live and dead**

Did you preserve any specimens in isopropyl (rubbing) alcohol? ☐ **Yes** ☐ **No**

Other Comments:_____

_____

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Please submit form to:

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P.O. Box 180
Jefferson City, MO 65102-0180

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Voice Mail: 800/781-1989
Fax: 573/526-0990
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